

TEACHING BURNT TREES NEW TRICKS: APPLYING FIRE HISTORY METHODS TO ARCHAEOLOGICAL RESEARCH QUESTIONS

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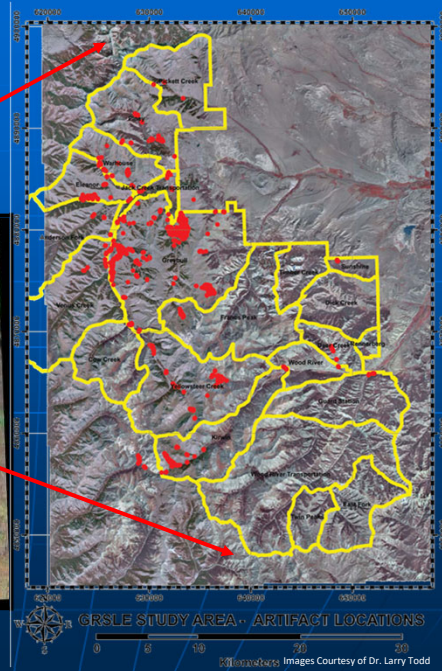
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Overview

- Introduction
- Modern impacts of wildland fires
- Using fire histories to reconstruct the past
- Discussion and Research Directions

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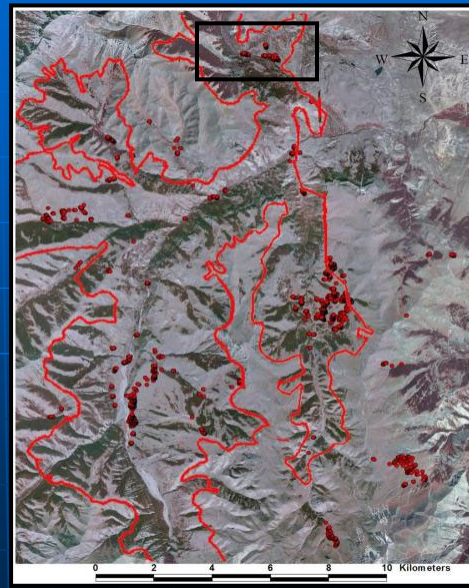
Greybull River Sustainable Landscape Ecology Project (GRSLE)



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2006 Little Venus Fire

- Nearly 35000 acres burned
- Provides unique opportunity to study fire history and a rich archaeological record



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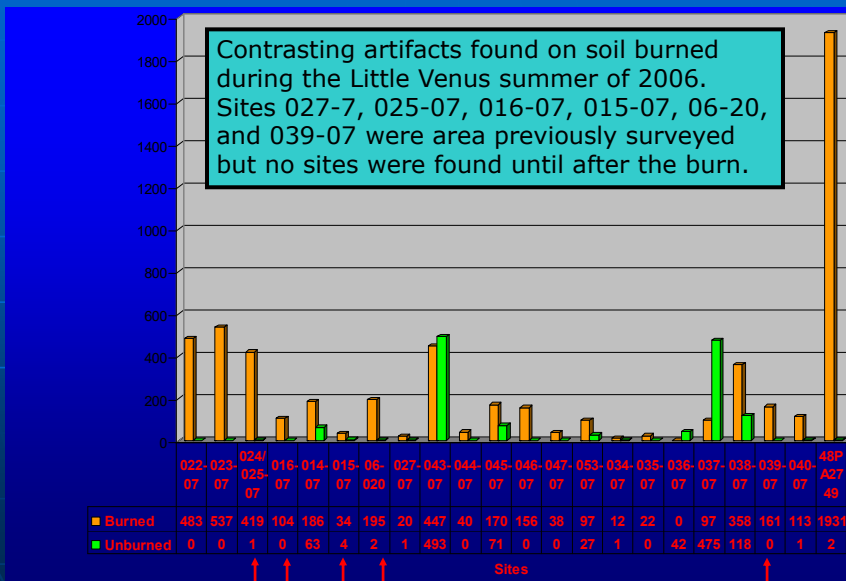
Impacts of the 2006 Little Venus Fire on the Archaeological Record in the Present

- 1.) Artifact destruction
- 2.) Increase visibility
- 3.) Interpretations and formation processes

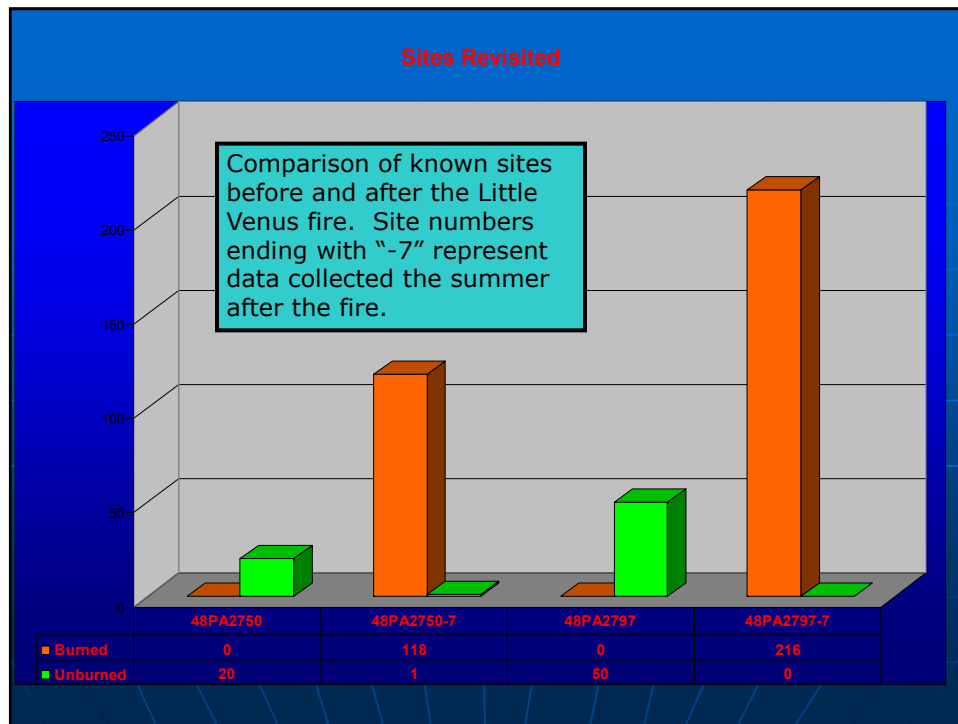


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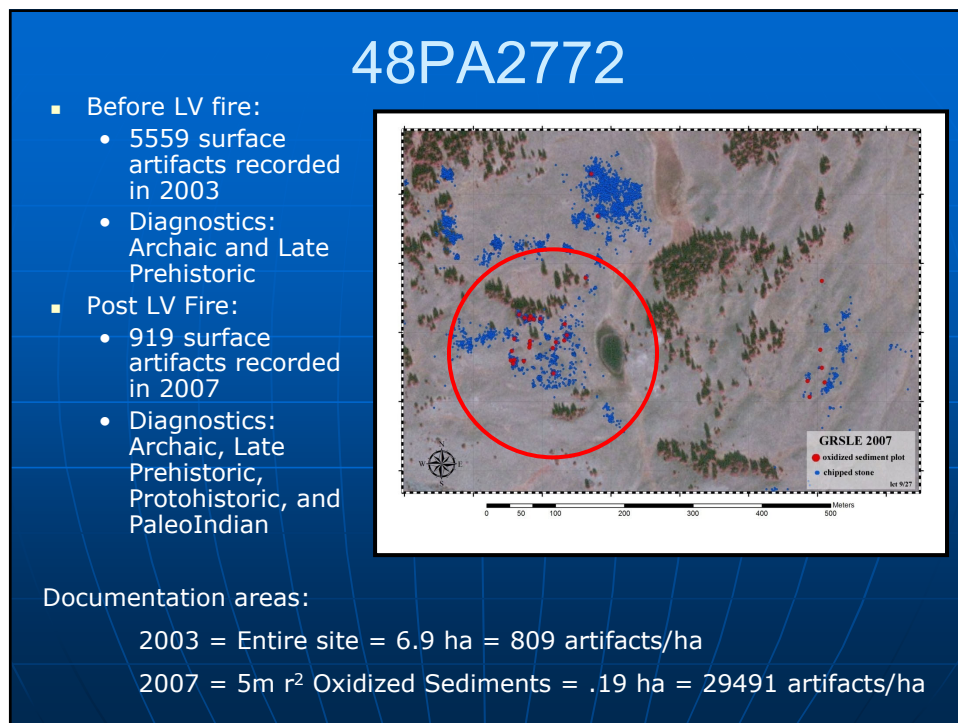
Surface Composition of Located Artifacts



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- Archaeological sites are not static entities
 - Dynamic, integrated, and evolving set of process of between biotic (including humans) and abiotic forces
- Landscapes
 - Also products of non static dynamic interactions between cultural, biological, and abiotic forces
- Taphonomy
 - Transition from the biosphere to the lithosphere



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Fire as an Ecological Process



- Keystone Evolutionary Process
 - For ecosystems
 - Fire adapted traits such as thick bark and serotiny
 - Also for humans
 - First extrasomatic technology
 - Center point for activity
- Always important to remember scale when examine role of disturbances such as fire

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Reconstructing the Past

1. What is the Fire History of the Piney Creek Drainage?
2. What is the relationship between the Protohistoric occupation Piney Creek drainage and the timing of prehistoric fires?

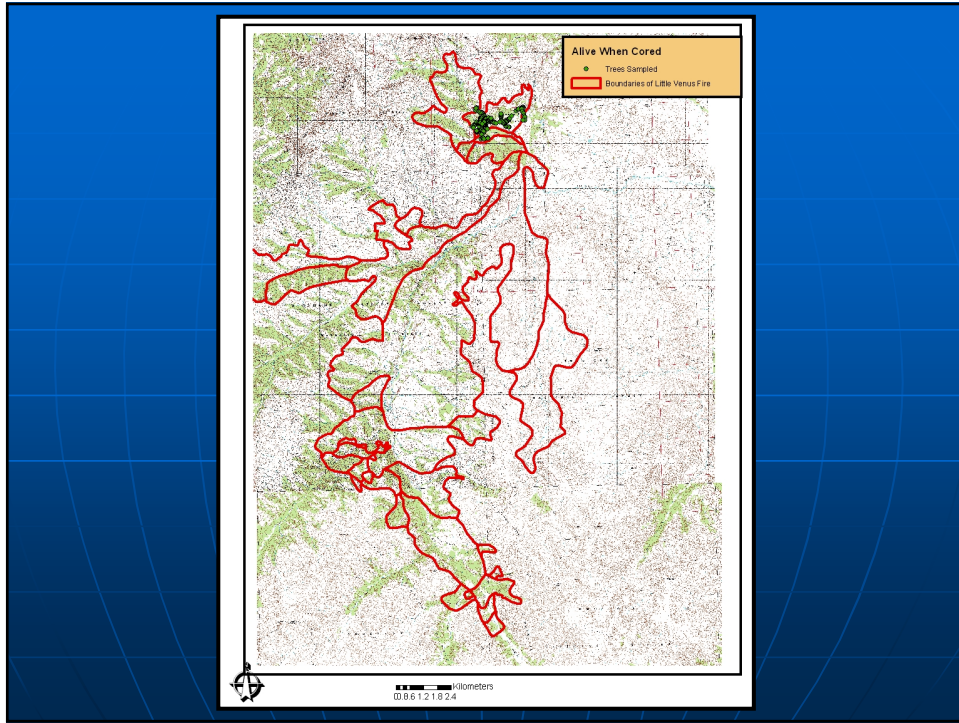
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Question 1: Methods

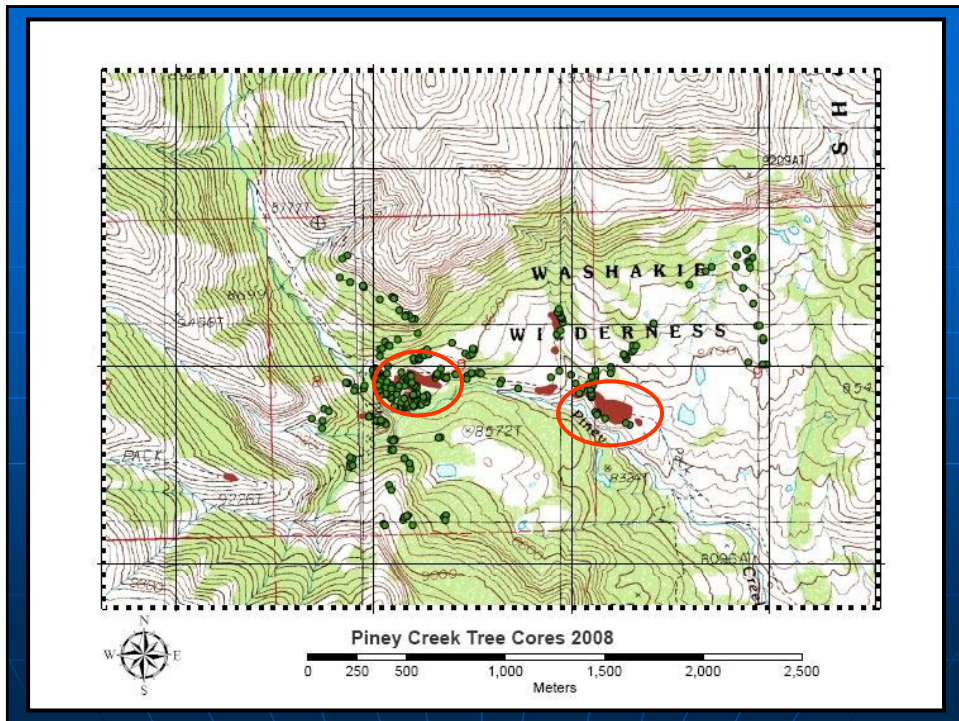
- Constructing a fire history



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Archaeological Data: Upper Piney Creek Site

- Protohistoric site
 - Glass trade beads
 - Metal fragments
 - Processed faunal material
 - Bone Collagen
 - 200±40 BP
 - (More dates in the mail)
 - 19 features (including hearths and bone clusters)



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Dendrochronological Data

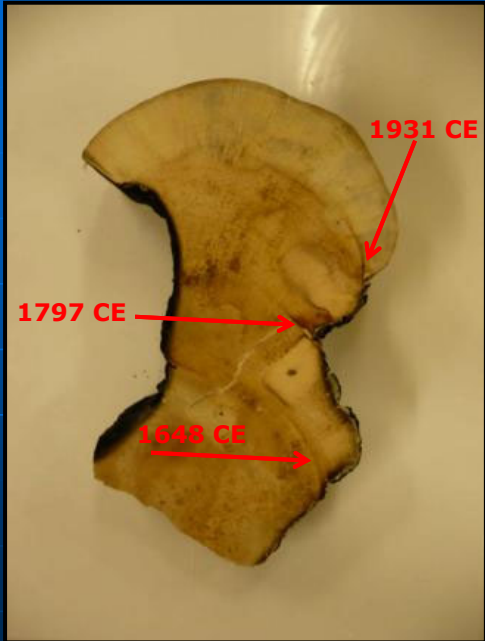
Code	Common Names	#
5N	Limber pine + Whitebark pine	256
PIEN	Engelmann spruce	44
ABLA	Subalpine fir	6
PSMEG	Douglas fir	56
Aspen	Aspen	5
999	No Data	13
	Total	380



26 Cross Sections for
Scar Crossdating



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Question 2: How the Fire History Compares to Human Occupation

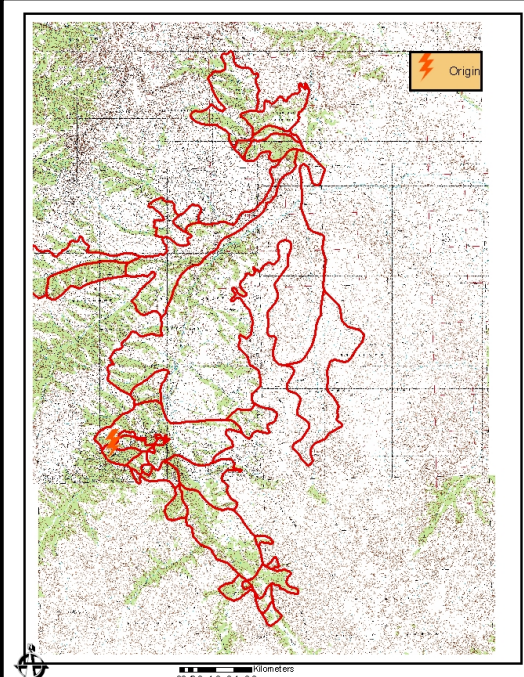
- Upper Piney Creek Site
 - Protohistoric
 - RC date 200±40 BP

Tree Number	Year of Scar
TC-079	1821
TC-226	1921
TC-247	1931
TC-038A	1954
TC-192	1954
TC-249A	1954
TC-184	1973
TC-073	1648, 1797, 1931
TC-046	1951, 1971

- Occupation vs Fire sequence

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- Fires are driven by three forces
 - Climate, Fuel, and Ignition
- Little Venus Fire was ignited by lightning strike



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Variability in Fire Regimes

- Some areas at low and high elevations have evolved with different types of fire regimes
 - Frequent, low intensity surface fires typify environments such as ponderosa pine and coastal redwood forests in lower elevations
 - Native American burning practices played a role in development in areas like coastal redwood forests where ignition sources such as lightning strikes were low
- Recent anthropogenic alterations to these ecosystems has introduced crown fire into surface fire system

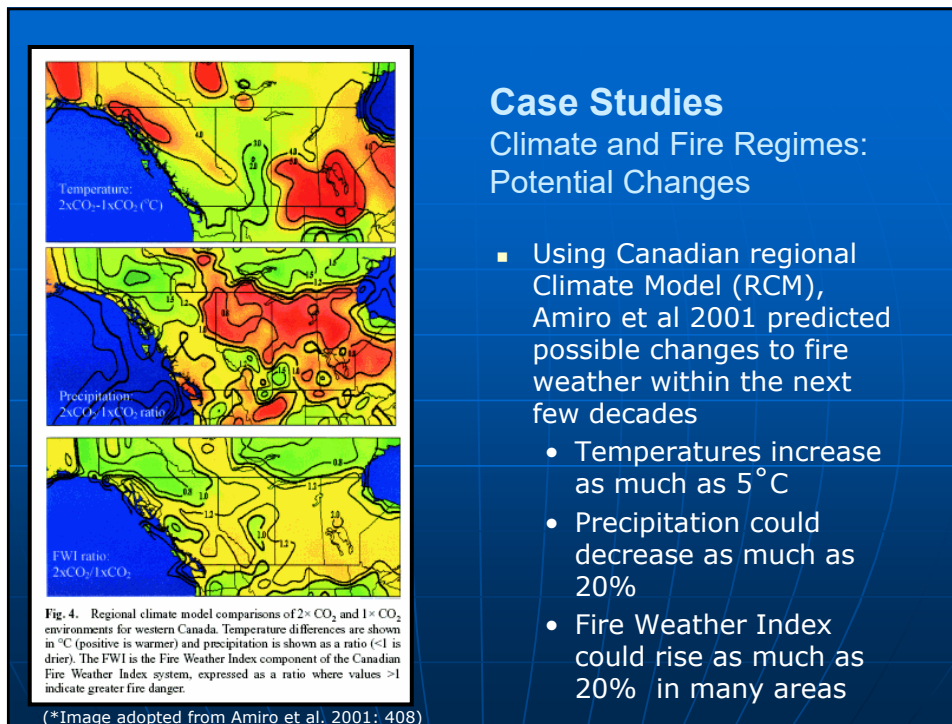
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Variability in Fire Regimes continued...

- Infrequent, high severity fire regimes typify higher elevation subalpine settings
 - Dominated by species such as lodgepole pines, mixed conifer, and spruces
- Because these areas are remote, post contact suppression rarely occurred
- This does not mean that other types of anthropogenic alteration have not impacted these areas



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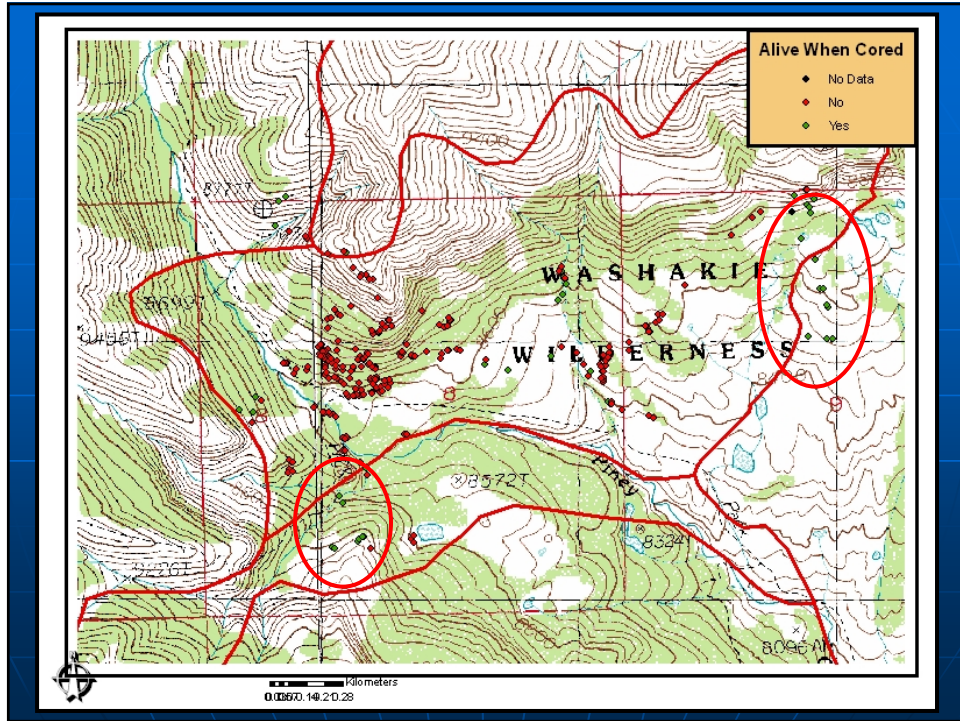


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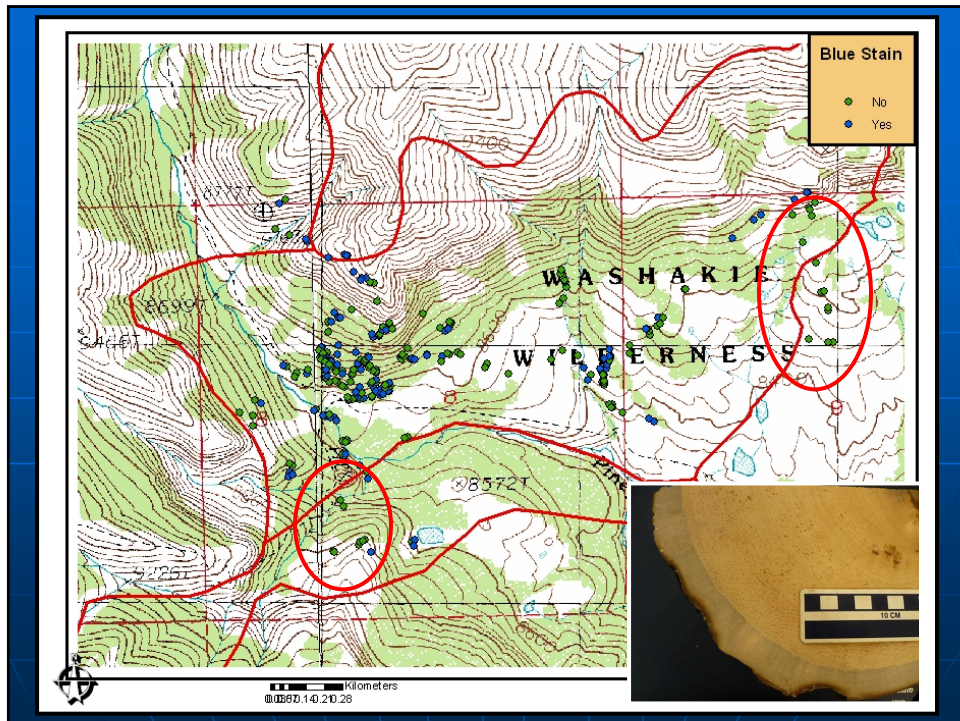
Increasing temperatures influence fire season as documented in the Northern Rockies by Westerling et al. 2006

- Time series of 1166 large forest wildfires from 1970 to 1986 and 1987 to 2003
 - 61% from western forested areas
 - 80% above 1370m
- Found only increased in the mid 1980s in forested areas
 - Frequency of wildfires 4 times average of 1970 to 1986
 - Total area burned 6.5 times the previous level
- Temperatures for 1987-2003 were $0.87^{\circ}C$ higher than 1970-1986

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Piney Creek: Where to go From Here?

- Were the previous fires during times of drought?
 - Reflected in the dendrochronological record?
- Contrast with ethnographic accounts
 - Climate and beetles?
- “Plugging” people into the mean fire intervals

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Discussion and Research Direction

- Dualism of archaeological research methods
- Modern processes influence what we see and interpret
 - Implications for management
- Fire history as proxy dataset
 - Compare to archaeological datasets to reconstruct past environments

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